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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/781,667	02/12/2001	Bijan K. Amini	EMT-14	9481

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EXAMINER
LE, TOAN M

ART UNIT	PAPER NUMBER
2862	

DATE MAILED: 02/18/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/781,667	AMINI, BIJAN K.	
	Examiner	Art Unit	
	Toan M Le	2862	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *12 February 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16 and 18-43* is/are pending in the application.

4a) Of the above claim(s) *17* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16 and 18-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3 and 5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

Specification

The disclosure is objected to because of the following informalities: page 8, in line 27; page 13, in lines 5, 9, 20-21; page 15, in line 20; page 16, in line 28; page 17, in lines 1-2, 5, 11-12, 18, 25-26; page 35, in line 2: "partial saturation", it is not clear what partial saturation means.

Appropriate correction is required.

Drawings

Please label blocks (figures 1 and 1A).

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the drawing for the claim 22 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 23-30 and 35-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 23, in lines 5 and 8, "partially saturated portion of the casing", it is not clear how the portion of the casing is partially saturated: the portion of the casing is either saturated or unsaturated.

Claim 24, in lines 1-4, "means to modify the partially saturated area of the casing in a controllable manner in order that the oscillating magnetic flux emitted from the exterior side of the partially saturated casing is directed in an intended manner", it is not clear how the area of the casing is saturated partially and then modified so that an oscillating magnetic flux is transmitted through from either interior or exterior side of the casing. The area of the casing is either saturated or unsaturated.

Claim 25, in line 1-2, "means to change the shape of the partially saturated area", it is not clear how the shape of the partially saturated area is change. The area is either saturated or unsaturated.

Claim 26, in line 1-2, "means to modify the permeability of the partially saturated casing", it is not clear how the permeability of the partially saturated casing is modified. The casing is either saturated or unsaturated.

Claim 27, in lines 1-3, "means to modify the partially saturated casing in relation to the saturation of the casing proximate to one or more receivers", it is not clear how the partially saturated casing is modified in relation to the saturation of the casing. The casing is either saturated or unsaturated.

Claims 28-30 are rejected as being dependent of rejected claim 23.

Claim 35, in line 1-2, ""means to measure the conductivity of the casing proximate to the logging tool", it is not clear what is the purpose of measuring the conductivity of the casing proximate to the logging tool in induction logging.

Claim 36, in lines 1-2, "means to measure the permeability of the casing proximate to the apparatus", it is not clear what is the need to measure the permeability of the casing proximate to the apparatus while the casing is saturated to reduce its permeability to unity.

Double Patenting

Claims 1-43 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2-43 of copending Application No. 09/716340 because it is obvious to one having ordinary skill in the art at the time the invention was made to have applied the disclosed method for measuring resistivity of media in geologic formations through either a well casing or tubing material manufacturing from a group containing at least ferromagnetic or paramagnetic materials.

Claims 1-43 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-17 of copending Application No. 09/946692 because it is obvious to one having ordinary skill in the art at the time the invention was made to have applied the disclosed method for focusing or lensing an oscillating magnetic flux to measure the electrical resistivity of media within a geologic formation surrounding a cased well bore.

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at

the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-16, 18, 31-37, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianzero et al..

Referring to claim 1, Gianzero et al. discloses a logging tool for measuring electrical resistivity of geologic formations through an electrically conductive and magnetically permeable well or borehole casing comprising: a saturation inducer for generating a first magnetic flux (col. 13, lines 63-64) and creating at least one magnetically saturated portion of the casing extending through the thickness of the casing (col. 13, lines 53-56); a transmitter for generating and transmitting an oscillating second magnetic flux through the saturated portion of the casing; and a receiver for detecting an oscillating magnetic flux transmitted from the exterior of the saturated portion of the casing (col. 13, lines 50-52 and col. 3, lines 6-9; figures 1-2 and 15).

Gianzeroet al. does not disclose a logging tool for measuring electrical resistivity of geologic formations through an electrically conductive and magnetically permeable well or borehole casing comprising a saturation inducer for engaging the magnetic flux with a portion of the casing without electrical contact between the saturating inducer and the casing.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have configured a saturating inducer for engaging the magnetic flux with a portion of the casing without electrical contact between the saturating inducer and the casing for improving the logging tool by having the saturating, transmitter, and receiver means to easily move through the casing and eliminating a need for an additional mechanical device to

make a physical contact between the saturating means and the casing for the saturation of the casing to reduce the operational cost.

As to claim 2, Gianzero et al. does not disclose the logging apparatus for measuring electrical resistivity of geologic formations through an electrical conductive and magnetically permeable well or borehole wherein the transmitter and the receiver are proximate to the saturated portion of the casing (figure 2).

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have configured the transmitter and receiver proximate to the saturated portion of the casing for focusing the oscillating magnetic flux through the saturated casing and detecting the oscillating magnetic flux transmitted from the exterior of the casing to have an accuracy measurement of electrical resistivity of geologic formations.

Referring to claim 3-4, Gianzero et al. discloses the logging apparatus for measuring electrical resistivity of geologic formations through an electrical conductive and magnetically permeable well or borehole comprising means for moving the apparatus through the axial direction of the casing (col. 13, lines 48-49; figure 2).

Gianzero et al. does not disclose logging apparatus comprising at least one housing to contain the saturation inducer, the transmitter, and the receiver.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have enclosed the saturation inducer, the transmitter, and the receiver in one housing for focusing the magnetic flux proximate to the saturated portion of the casing, avoiding the fringing fields, and eliminating the need for separate housings for each components and therefore reducing the cost.

As to claims 5-8, Gianzero et al. disclose a logging apparatus wherein the housing comprises non-magnetically permeable material (col. 4, lines 49-51).

Gianzero et al. does not disclose a logging apparatus wherein the housing comprises non-electrically conductive material.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have used a logging apparatus wherein the housing comprises a non-electrically conductive material for minimizing eddy current induced in the material so that a more accurate measurement can be obtained.

Referring to claims 9-10, Gianzero et al. disclose a logging apparatus comprising at least one separately located power source 33 (figure 1) and one means separately located from the transmitter and receiver for receiving an electrical signal corresponding to the oscillating magnetic flux detected by the receiver and connected to the receiver by means to transmit such electrical signal (col. 13, lines 65-68).

Gianzero et al. does not disclose a logging apparatus comprising at least one means separately located from the saturation inducer, transmitter, and receiver for receiving an electrical signal corresponding to the oscillating magnetic flux detected by the receiver and connected to the receiver by means to transmit such electrical signal.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have used at least one means separately located from the saturation inducer, transmitter, and receiver for receiving an electrical signal corresponding to the oscillating magnetic flux detected by the receiver means and connected to the receiver by means

to transmit such electrical signal for avoiding the fringing fields originated from the saturation inducer, transmitter, and receiver so that a more accurate measurement is possible.

As to claims 11-13, Gianzero et al. discloses a logging apparatus comprising an output display and means to record the received electrical signal (figure 1).

Gianzero et al. does not disclose a logging apparatus comprising an output display and means to record the location of the receiver.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have included an output display and means to record the location of the receiver for obtaining a plurality of received electrical signals from different locations of geologic formations to detect the phase and amplitude difference among different locations so that a measurement of resistivity in different layers of geologic formations is accurately possible.

Referring to claims 14-15, Gianzero et al. discloses a logging apparatus comprising electrical storage means 33 to provide electricity for generating, transmitting, and receiving magnetic flux (figure 1).

Gianzero et al. does not disclose a logging apparatus wherein the electrical power storage means is at least one battery.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have included at least one battery as a back up for the electrical power storage means for reserve purpose in case of power failure.

As to claim 16, Gianzero et al. discloses a logging apparatus comprising means 25 to record the electrical signal received.

Gianzero et al. does not disclose a logging apparatus comprising means to record the location of the housing within the axial length of the casing.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have added means to record the location of the housing within the axial length of the casing for making high resolution induction logging measurements within the length of the casing to compare logging measurements along the length the casing so that any irregularities in the casing due to manufacturing process such as cracks or faults can be detected.

Referring to claim 18, Gianzero et al. discloses a logging apparatus wherein at least one of the receiver means is located proximate to the saturation inducer (figure 2).

Gianzero et al. does not disclose a logging apparatus wherein at least one of the transmitters is located proximate to another saturation means.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have included at least one of the transmitters is located proximate to the saturation means and at least one of the receiver means is located proximate to another saturation means for avoiding the fringing fields originated from the transmitter and the receiver means to allow a more accurate measurement of the formation response.

As to claims 31, 33, and 34, Gianzero et al. discloses a logging apparatus wherein the magnetic flux generated by the saturating means is a DC flux with a constant amplitude (col. 13, lines 62-64) utilized a dc electrical power (col. 5, lines 39-41) and the transmitter means uses ac electrical power (col. 5, line 66-68; figure 1).

Gianzero et al. does not disclose a logging apparatus wherein the saturation means comprises a permanent magnet.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have used a permanent magnet as a saturation means for having a suitable and efficient alternative means to saturate the casing.

As to claim 32, Gianzero et al. discloses a logging apparatus comprising means for inducing a magnetic flux in the transmitter coil which is sufficiently massive to saturate the casing (col. 3, lines 18-22).

Gianzero et al. does not disclose a logging apparatus wherein the saturation means and transmitter means utilize the same electrically conductive coil.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have included the saturation means and transmitter means utilize the same electrically conductive coil for inducing a magnetic flux in the transmitter coil to saturate the casing.

Referring to claims 35-37, Gianzero et al. discloses a logging apparatus comprising means to measure the thickness of the casing proximate to the logging tool and related electrical properties (col. 2, lines 32-37; figure 7).

Gianzero et al. does not disclose a logging apparatus comprising means to measure the conductivity and permeability of the casing proximate to the logging tool.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have added means to measure the conductivity and permeability of the casing proximate to the logging tool.

Referring to claim 43, Gianzero et al. discloses a method for detecting electrically resistive media within a geologic formation by transmitting and receiving magnetic flux through

an electrically conductive and magnetically permeable casing comprising the steps of: creating at least one magnetic flux within the interior of the casing using a flux generating means; engaging the interior side of the casing with the magnetic flux with physical contact between the flux generating means and the casing for creating at least one magnetically saturated area which extends through a thickness of the casing to the exterior side (col. 13, lines 53-56; figure 2); creating at least one oscillating magnetic flux; transmitting oscillating magnetic flux through at least one magnetically saturated area of the casing to induce eddy currents within electrically conductive media located proximate to the exterior side of the magnetically saturated casing (col. 13, lines 53-56 and col. 1, lines 13-18); and using at least one receiver means located inside the casing for detecting oscillating magnetic flux transmitted through the casing that is induced by the eddy currents within the electrically conductive media proximate to the exterior side of the magnetically saturated casing (col. 13, lines 65-68).

Gianzero et al. does not disclose a method for detecting electrically resistive media within a geologic formation by transmitting and receiving magnetic flux through an electrically conductive and magnetically permeable casing comprising engaging the interior side of the casing with the magnetic flux without physical contact between the flux generating means and the casing for creating at least one magnetically saturated area which extends through a thickness of the casing to the exterior side.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have engaged the interior side of the casing with the magnetic flux without physical contact between the flux generating means and the casing for improving the logging tool by having the saturating, transmitter, and receiver means to easily move through the

casing eliminating a need for an additional mechanical device to make a physical contact between the saturating means and the casing for the saturation of the casing to reduce the operational cost.

Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianzero et al. in view of Mitchell.

As to claims 19-21, Gianzero et al. discloses a logging apparatus comprising transmitting a plurality of differing frequencies of oscillating magnetic flux (col. 14, lines 19-21).

Gianzero et al. does not disclose a logging apparatus wherein the differing frequencies of oscillating magnetic flux are transmitted simultaneously and sequentially.

Mitchell discloses a logging apparatus wherein the differing frequencies of oscillating magnetic flux are transmitted sequentially (col. 5, lines 24-28).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have transmitted the differing frequencies of oscillating magnetic flux simultaneously and sequentially described in the Mitchell reference for comparing the received signals at these frequencies for substantially removing possible residual casing signal to have a better measurement of electrical properties of formation.

Claims 38 and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianzero et al. in view of Chandler et al..

As to claim 38, Gianzero et al. does not disclose a logging apparatus comprising a means to null the transmission of signals directly from the transmitter means to the receiver means.

Chandler et al. discloses a logging apparatus comprising a means to null the transmission of signals directly from the transmitter means to the receiver means (col. 4, lines 23-29).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have included a means to null the transmission of signals directly from the transmitter means to the receiver means described in the Chandler et al. reference for avoiding direct signals coupling between the transmitter means and the receiver means and eliminating fringing fields from the transmitter and receiver means so that an accuracy measurement is possible.

Referring to claim 41, Gianzero et al. does not disclose a logging apparatus wherein the transmitter means and receiver means are separated by magnetically unsaturated material.

Chandler et al. discloses a logging apparatus wherein the transmitter means and receiver means are separated by magnetically unsaturated material (col. 4,lines 23-29; figure 1).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have used a magnetically unsaturated material to separate the transmitter means and receiver means as described in the Chandler et al. reference for avoiding the fringing fields originated from the transmitter and receiver means coupling each other to have an accuracy measurement of electrical properties of formation.

As to claim 42, Gianzero et al. does not disclose a logging apparatus wherein the transmitter means is placed upon a material having sufficient mass and magnetic permeability to direct the transmitter flux in a manner to minimize the quantity of transmitter flux reaching the receiver means.

Chandler et al. discloses a logging apparatus wherein a secondary coil 14 is placed between the transmitter means and receiver means to direct the transmitter flux in a manner to

minimize the quantity of transmitter flux reaching the receiver means (col. 4, lines 23-29; figure 1).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have added the transmitter means placed upon a material having sufficient mass and magnetic permeability to direct the transmitter flux in a manner to minimize the quantity of transmitter flux reaching the receiver means to have a simple and accurate logging tool.

Claims 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianzero et al. in view of Rorden.

Referring to claims 39-40, Gianzero et al. do not disclose a logging apparatus wherein the nulling means comprises geometric nulling and wherein the receiver is configured on a plane normal to the plane of the transmitter.

Rorden discloses a logging apparatus wherein the nulling means comprises geometric nulling and wherein the receiver is configured on a plane normal to the plane of the transmitter (col. 6, lines 15-20).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have configured the receiver plane and transmitter plane normal to each other for having a single transmitting channel and a single receiving channel to avoid signals coupling between the transmitter means and receiver means.

Remarks:

Response to Arguments

Applicant's arguments filed on 12/2/02 have been fully considered but they are not persuasive.

Referring to claims 23-27 and 35-36, applicant argues that "Simply stated, when partially saturated, the permeability of the casing is substantially reduced, thereby allowing greater penetration by the oscillating transmitter flux, particularly at higher frequencies".

It is well known that magnetic materials are either saturated or non-saturated; besides, permeability of magnetic materials are never reduced by any applied magnetic fields, only by mechanical means.

As to claims 1-16, 18, 31-37, and 43, applicant argues that "Gianzero does not disclose a second magnetic flux source or second transmitter source".

Gianzero does disclose a second transmitter source (figure 15).

Applicant also argues that "Gianzero is not concerned with the extent or control of the saturation of the casing,... Applicant seeks to control the degree of saturation...."

It is well known that once the casing is magnetically fully saturated, the magnetic flux can be transmitted through the casing. When the casing is not fully saturated, the magnetic flux can't be transmitted through.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toan M Le whose telephone number is (703)305-4016. The examiner can normally be reached on Monday through Friday from 9:00 A.M. to 5:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (703)305-4816. The fax phone numbers for the

organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-0956.

Toan Le

February 13, 2003

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